

## RESERVOIR STIMULATION SERVICES TO INCREASE ULTIMATE RECOVERY

The shale revolution of recent years continues to provide abundant supplies of oil and gas to meet the nation's energy needs. However, while many of these wells are still producing economically, some need remedial solutions to help maintain or increase production.

C&J Energy Services has a range of technologies engineered to help regain production and increase the ultimate recovery from your well. Across the continental U.S., our unsurpassed experience in unconventional reservoirs enables us to tailor an effective and economical solution to help increase production.

- We bring our unmatched quality and customer-first approach to every customer, on every job.
- C&J provides a full package of services for your well, including wireline services and a full range of coiled-tubing services.
- Our engineering group and Research & Technology division can help identify problems and provide solutions for the most challenging reservoir.
- C&J engineers and laboratory technicians can design a fluid system compatible with your particular well parameters. Our PureStim™ fluid systems can be designed to perform over a wide range of temperatures and applications.
- Safe and experienced crews are ready to help you get production online in a timely manner.

Our engineering group will review the initial well-completion plan, study the well's production decline curve and take into account formation characteristics to devise the best solution for your well.

### Re-Con<sup>SM</sup> Frac-Less Restimulation

Pipe integrity issues can prevent high-pressure treatments from being a viable option. When this is the case, C&J's proven Re-Con frac-less restimulation is the solution.

By cleaning the wellbore and the existing fracture network, this treatment remediates damage to the perforations and the proppant pack – without the possibility of damaging the casing string. Using the latest in advanced chemistries and several leading-edge technologies, we provide the highest probability of engineered success for each well treatment.

### Acid-Wash Service

Well performance is affected by many factors. Depletion of the reservoir through normal production causes pressure drops across the fractures and perforations. The pressure drops can often result in damage due to:

- Scale formation from produced waters
- Organic depositions from the produced fluids
- Wettability alterations due to insufficient surfactant applications/loadings
- Emulsions from pH shifts
- Incompatible or contaminated base fluids
- Polymer damage sustained during the initial fracturing process from guar and polyacrylamide friction reducers

# RESERVOIR STIMULATION SERVICES TO INCREASE ULTIMATE RECOVERY

## Acid-Wash Service, continued

Once production begins to decline, identifying the right solution is critical. Often, refracturing the well isn't necessary. In many cases, acidizing to remove damage can be a viable, more cost-effective solution.

Our engineers and laboratory technicians can formulate an appropriate acid system to remove the damage. These treatments can be pumped using various techniques, based on specific well conditions. Each solution will be tailored to the individual well and formation for the most effective treatment available.

## Refracturing Service

When you look at the decline curve of any unconventional reservoir, reserves are always left on the table. Research shows that not all perforations are stimulated during the initial completion.

Small-mesh sands have been proven to flow back into the proppant pack, and fines migration is one of the quickest ways to kill a low-permeability reservoir. What if you could go back and try again with something better?

C&J's refracturing service can help you do just that. Based on your well's production and reservoir data, our engineers will help you select the best-suited diversion method to target understimulated perforations. These cost-effective, top-performing diverters are easy on your budget and won't damage the formation.

## LateralScience<sup>SM</sup> Process

Placement of the perforations during the refracturing process is just as important as fluid and proppant selection. An engineered approach enables you to strategically place the perforations to get maximum reservoir contact. Our proven, cost-effective process provides a solution using data you already have on hand.

The LateralScience engineered-completion process leverages commonly available drilling measurements and mud-motor parameters to assess the reservoir and help guide the placement of perforation clusters. The result is an optimized horizontal completion in which the perforations break down at a common treating pressure, which delivers a uniform fracture treatment within each frac stage.

## Engineering the Best Possible Outcome for Your Stimulation Treatment

C&J Energy Services is a leading provider of onshore well construction, well completions and well services. With headquarters in Houston, Texas, we have operations and facilities in all major oil-and-gas producing regions of the continental U.S.

As one of the largest completion and production services companies in the country, we offer a full suite of services for the entire life cycle of the well. Services include fracturing, wireline, coiled tubing, cementing, rig services, fluids management services and other special wellsite services. For more information, contact your local C&J representative.